

MRI APPARATUS

CROSS REFERENCE TO RELATED APPLICATION

515104

[0001] The present application is a divisional of United States Patent Application No. 09/200,099, filed November 25, 1998, which is a continuation-in-part of United States Patent Application No. 08/975,913, filed November 21, 1997, which is a continuation-in-part of United States Patent Application No. 07/993,072, filed December 18, 1992, the disclosures of which are hereby incorporated by reference herein. United States Patent Application No. 08/975,913 is also a continuation-in-part of United States Patent Application No. 08/978,084, filed November 25, 1997, the disclosure of which is also incorporated by reference herein.

now US PAT. 6,335,623
now US PAT. 6,201,394
now US PAT. 6,023,165
now abandon

BACKGROUND OF THE INVENTION

[0002] The present invention relates to magnetic resonance imaging or "MRI".

[0003] MRI is widely used in medical and other arts to obtain images of a subject such as a medical patient. The patient's body is placed within a subject-receiving space of a primary field magnet and exposed to a strong, substantially constant primary magnetic field. The atomic nuclei spin around axes aligned with the magnetic field. Powerful radio frequency "RF" signals are broadcast into the subject-receiving space to excite atomic nuclei within the patient's body into a resonance state in which the spinning nuclei generate minuscule RF signals. These signals are referred to herein as magnetic resonance signals. Magnetic field gradients are applied so that the magnitude of the magnetic field varies with location inside the subject-receiving space. As a result, characteristics of the magnetic resonance signals from different locations within the region, such as the frequency and phase of the signals, can be made to vary in a predictable manner, depending upon position within the region. Thus, the magnetic resonance signals are "spatially encoded" so that it is possible to distinguish